

UNIVERSITY OF BAHRAIN
COLLEGE OF INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

ITCS390 – Software Engineering I

Midterm Exam

Semester I, Thursday 26-11-2015 15.00 : 16.30 PM

Time Allowed: 1.30 Hour

Student I.D.			
Student Name			
	<table border="1" style="display: inline-table;"><tr><td style="width: 50%; text-align: center;">UTH ✓</td><td style="width: 50%; text-align: center;">MW</td></tr></table>	UTH ✓	MW
UTH ✓	MW		

CILOs	Question	Actual marks	Achieved marks
2	N#1	13	8
1	N#2	7	4
1,3,4	N#3	20	20
6	N#4	20	20
TOTAL		60	52

You have 7 **pages** including the cover Page
/ extra space (on the back of the pages) mark the question numbers clearly.
I write your **Name, ID#** and **Section number** clearly.
mobile phone please **switch it off** before the test starts.
ability to **hand over the answer** sheet to the invigilation staff.

Q#1.1: Define software engineering according to any of the following:

CMU/SEI-90-TR-003, IEEE std 610-1990 or Pressman (3 marks)

using computer tools to solving Problems

X

8
13

Q#1.2: The phases of software engineering are complemented by a number of umbrella activities, list four (4) of them.[3 marks]

Typical umbrella activities include:

1. ^{Formal} Software Technical reviews

2. reusability management ✓

3. Measurements, risk analysis ✓

4. Software quality assurance ✓

2.5
3

Q#1.3: Use the following table and compare between small, medium and large systems.[7 marks]

systems	Calculator with 4 basic functions	Student registration system	ERP (Enterprise resource planning system)
Process models	use simple model Waterfall-model X	Waterfall model with prototyping ^{since} requirements may change/or evolutionary model	use component-based model based to build subsystems and integrate them. ✓
Human resources	Small human resources 1 person can be enough	a small team or <u>medium sized</u> . ✓	big team working on subsystems after deciding the project. ✓
Tools	C++ Simple tools small system to build it.	Special tools ✓ decision table, structured english	highly special tools ✓ use outsourcing, Programs for managing the work like MS projects.

5.5

Q#3.1: What are the methods of collecting requirements and which of these methods you have used during your work in the library management system project? [5 marks]

The methods of collecting requirements:

Traditional {

- interviewing individuals ✓
- interviewing groups ✓
- distributing questionnaires ✓
- business documents ✓

Contemporary methods

- JAD ✓
- Case tool ✓
- Prototyping ✓

We interviewed individuals, 2 of the staff working in the IT library, & we also distribute questionnaires to students of university of Bahrain.

Q#3.2: Write five (5) core functional requirements of the library management system that you are working on. [5 marks]

- 1) The system should allow the student to search for books using different attributes like book ISBN, author name, range in years, ...
- 2) The system should allow the student to borrow books after providing his information, if the book is not reserved.
- 3) The system should provide the functionality of generating reports to the library manager.
- 4) The system should allow the librarians (staff) to maintain books information [add, delete and update].
- 5) The system should allow the students to pay fines they have due to late in returning books.

Q#3.1: What are the methods of collecting requirements and which of these methods you have used during your work in the library management system project? [5 marks]

The methods of collecting requirements:

- | | | | |
|-------------|---|----------------------|---|
| Traditional | <ul style="list-style-type: none">- interviewing individuals ✓- interviewing groups ✓- distributing questionnaires ✓- business documents ✓ | Contemporary methods | <ul style="list-style-type: none">- JAD ✓- case tool ✓- prototyping ✓ |
|-------------|---|----------------------|---|

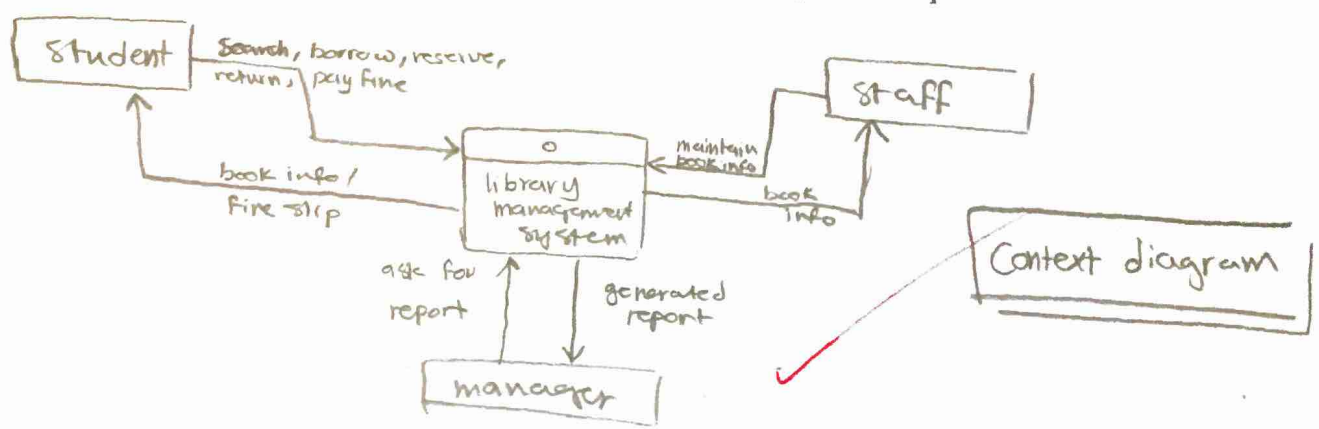
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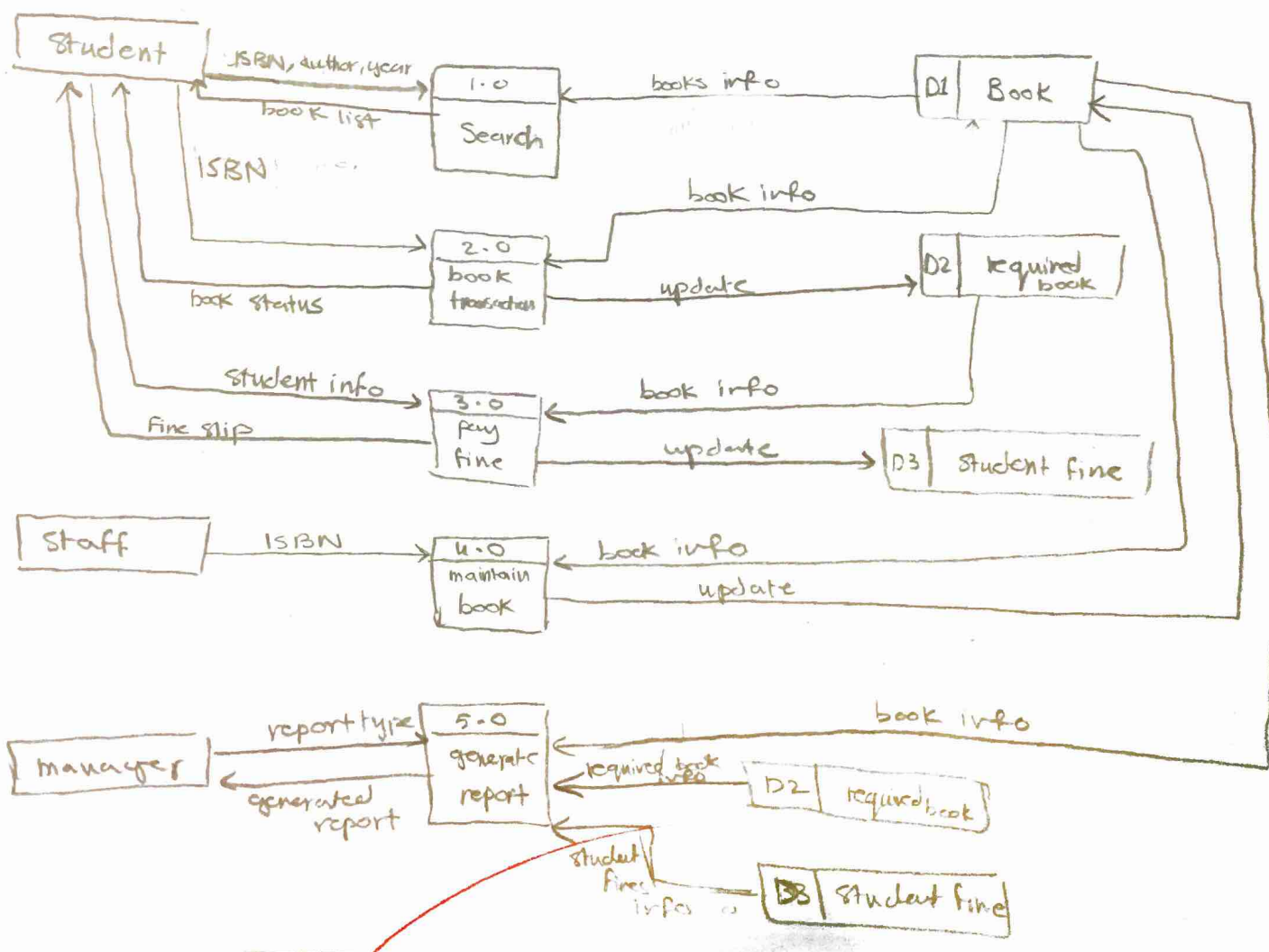
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10/10

Q#3.3: During this semester you and your team members are working on library management system. Draw the context diagram and level 0 (contains major processes) [10 marks]



level - 0



Q#4.0 Answer the following questions related to project management [20 marks]

1. What is a project? [2marks]

a planned Process including activities, constraints, resources, to achieve objectives and it has a beginning and an end.

2. Explain briefly the phases of project management process? [6 marks]

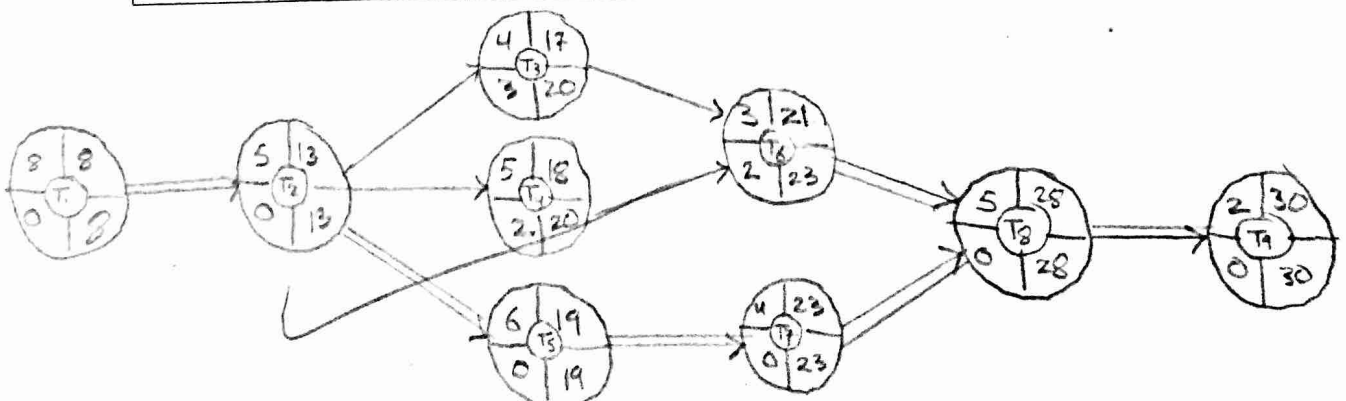
1. Phase 1: Initiating: initiate team members, put the initial Plan, ^{decide} managing procedure, decide management Environment, prepare the work book.
2. Phase 2: Planning: define the Project requirements, resources, risks, scope, and put the BPP (baseline Project Plan), decide Project into tasks, prepare primary Schedule, define the Project work statement, the communication Procedure.
3. Phase 3: Executing: put the baseline Plan into work, monitor progress of the plan and manage changes in the baseline Plan.
4. Phase 4: Closing down: close the Project, Post-project views, close customer contract

3. Assume you have a project with 9 activities labeled T1-T9. Derive the earliest completion time (or early finish-EF), latest completion time (or late finish-LF), and slack time. Draw Network diagram for these tasks, and make sure you highlight the critical path on your Network diagram. (Note: The tasks, preceding events, and the expected durations are provided in the following table.) [12 marks]

Activity Name	Expected durations	Preceding events	Early Finish	Late Finish	Slack time LF-EF	Critical path
T1	8	--	8	8	0	Yes
T2	5	T1	13	13	0	Yes
T3	4	T2	17	20	3	No
T4	5	T2	18	20	2	No
T5	6	T2	19	19	0	Yes
T6	3	T3, T4	21	23	2	No
T7	4	T5	23	23	0	Yes
T8	5	T6, T7	28	28	0	Yes
T9	2	T8	30	30	0	Yes



ET: Estimated time
EF: early Finish
LF: late Finish
ST: slack time



EF

① T_1

$$EF(T_1) = ET(T_1) = 8$$

② T_2

$$EF(T_2) = EF(T_1) + ET(T_2) \\ = 8 + 5 = 13$$

③ T_3

$$EF(T_3) = EF(T_2) + ET(T_3) \\ = 13 + 4 = 17$$

$$T_4 = 13 + 5 = 18$$

$$T_5 = 13 + 6 = 19$$

④ T_6

$$EF(T_6) = \text{largest}(EF_3, EF_4, \dots) + ET(T_6) \\ = 18 + 3 = 21$$

⑦ T_7

$$EF(T_7) = EF(T_5) + ET(T_7) \\ 19 + 4 = 23$$

⑧ T_8

$$EF(T_8) = \text{largest}(EF_6, EF_7) + ET(T_8) \\ = 23 + 5 = 28$$

⑨ T_9

$$EF(T_9) = EF(T_8) + ET(T_9) \\ = 28 + 2 = 30$$

LF

① T_9

$$LF(T_9) = EF(T_9) = 30$$

② T_8

$$LF(T_8) = LF(T_9) - ET(T_8) \\ = 30 - 2 = 28$$

③ T_7

$$LF(T_7) = LF(T_8) - ET(T_7) \\ = 28 - 5 = 23$$

④ T_6

$$LF(T_6) = LF(T_7) - ET(T_6) = 23$$

⑤ T_5

$$LF(T_5) = LF(T_6) - ET(T_5) \\ 23 - 4 = 19$$

⑥ T_4

$$LF(T_4) = LF(T_5) - ET(T_4) \\ = 23 - 3 = 20$$

⑦ T_3

$$LF(T_3) = LF(T_4) - ET(T_3) = 20$$

⑧ T_2

$$LF(T_2) = \text{Smallest}(LF_3, LF_4, LF_5) - ET(\text{Smallest}) \\ = 19 - 6 = 13$$

⑨ T_1

$$LF(T_1) = LF(T_2) - ET(T_1) \\ = 13 - 5 = 8$$

① Early finish

$$EF(T_i) = ET(T_i) + \text{before} \\ EF(T_i) = \text{largest}(EF, EF) + ET(T_i)$$

② Late finish

$$LF(T_i) = EF(T_i) + \text{after} \\ LF(T_i) = \text{Smallest}(LF, LF) - ET(\text{Smallest})$$

③ Slack time

$$LF - EF$$